

Solanum succosum A.R.Bean & Albr. (Solanaceae), a new species allied to *S. chippendalei* Symon

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Summary

Bean, A.R. & Albrecht, D.E. (2008). *Solanum succosum* A.R.Bean & Albr. (Solanaceae), a new species allied to *S. chippendalei* Symon. *Austrobaileya* 7(4): 669–675. The new species, *Solanum succosum* from Queensland and the Northern Territory, is described and illustrated. It is closely allied to *S. chippendalei* for which a comparative description is provided. Distribution maps are presented for both species and *S. succosum* is illustrated.

Key Words: *Solanum succosum*, *Solanum chippendalei*, Solanaceae, taxonomy, Australian flora, identification

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Introduction

In his revision of Australian *Solanum*, Symon (1981) identified a group of closely related species (*S. melanospermum* F.Muell., *S. chippendalei* Symon, *S. phlomoides* A.Cunn. ex Benth. and *S. beagleholei* Symon), which he termed a “quartet of species with common ancestry”. He did not outline the distinguishing features of the group, but these species may be characterised by the strongly andromonoecious inflorescences (one bisexual flower at the base and numerous male flowers above), the calyx not accrescent (although the calyx lobes may be almost as long as the mature fruit), the black seeds, and the fruits 21–40 mm diameter (among the largest for *Solanum* spp. in Australia).

Solanum chippendalei sensu Symon, extends from the eastern Pilbara region in Western Australia to Winton in northwest Queensland, in semi-arid hummock grassland and shrubland to woodland habitats. Field and herbarium observations by the authors indicate Symon’s concept of *S. chippendalei* comprises two species: *S. chippendalei* and *S. succosum* A.R.Bean & Albr., here described as new.

Materials and methods

The present study is based on herbarium specimens at BRI (including material in spirit), CANB, DNA, NT, MEL and PERTH as well as field studies by the authors in Queensland (Qld), southern Northern Territory (NT) and the Pilbara region of Western Australia (WA).

The species descriptions and terminology presented in this paper follow those of Bean (2004) and all data gathered during this study have been added to an existing DELTA (Dallwitz *et al.* 1993) dataset. An interactive key covering *Solanum* spp. of eastern Australia is available at the DELTA website (<http://delta-intkey.com/>).

Prickle width is measured just above the base of the prickle, where the prickle surface is at 45° to the branch. The prickle length is the distance from this position to the apex of the prickle. Adult leaves are those adjacent to, or distal from, the inflorescences.

Taxonomy

Solanum succosum A.R.Bean & Albr. **species nova** affine *S. chippendalei* sed a quo foliis inferioribus profunde lobatis, filamentis multo longioribus dorsifixis, seminibus minoribus, et fructibus persistentibus cavitate interna liquido impleta et pericarpio tenuiore praeditis, differens. **Typus:** Queensland. BURKE DISTRICT: c. 8 km along road to Lady

Loretta Mine, turnoff c. 65 km from Mt Isa, 24 August 1993, *T.R. Lally 101* (holo: BRI; iso: CANB, DNA).

Solanum sp. Juicy Fruit (P.K.Latz 18938) in Albrecht *et al.* (2007).

Illustration: Symon (1981: 273), as *Solanum chippendalei*.

Erect, rhizomatous perennial shrub 0.4–1.5 m high. Adult branchlets terete or ridged, white, grey, yellow, rusty or brown; prickles 3.5–40 per cm, straight, acicular, 1–10 (–13) mm long, 7–16 times longer than wide, with dense stellate hairs on lower part; stellate hairs very dense, 0.7–1.3 (–1.6) mm diameter, stalks 0–1.6 (–2) mm long, lateral rays 7–8, porrect or ascending; central ray 1–1.5 times as long as laterals, not gland tipped. Adult leaves lanceolate, elliptical or ovate, shallowly or deeply lobed throughout, lobes 2–4 on each side, obtuse, lobing index 1.2–5, at least the lower leaves always deeply lobed; lamina 3–12 cm long, 1.4–5.3 (–8) cm wide, 1.6–3.5 times longer than broad; apex obtuse or acute; base cuneate or obtuse; oblique part 0–11 mm long, obliqueness index 0–10 percent; petioles 0.8–2.1 cm long, 20–30% length of lamina, prickles present. Upper leaf surface grey-green or grey, prickles 0–8, straight, acicular or broad-based, 3–10 mm long; stellate hairs distributed throughout, stellate hairs dense to very dense, 0.15–0.3 mm apart, 0.5–1 mm across, stalks 0–0.5 mm long; lateral rays 6–9, porrect or ascending; central ray 1–2.5 times as long as laterals, not gland-tipped; simple hairs absent; Type 2 hairs absent. Lower leaf surface grey, white, or yellowish, prickles 0–5, straight, acicular or broad-based; stellate hairs dense to very dense, 0.1–0.2 mm apart, 0.7–1.5 mm diameter, stalks 0–0.8 mm long; lateral rays 6–8, porrect; central ray 1–1.8 times as long as laterals, not gland tipped; simple hairs absent; Type 2 hairs absent. Inflorescence supra-axillary, cymose (pseudo-racemose), common peduncle 0–3 mm long, rhachis prickles present, 7–11-flowered, with one usually markedly larger bisexual flower, the rest male. Pedicels at anthesis 5–23 mm long, prickles absent or present. Calyx prickles on basal bisexual flower 35–125, each 2–6 mm long; calyx prickles on distal male flowers 0–

15, each 1–5 mm long; calyx tube at anthesis 3–5 mm long, lobes attenuate, 6.5–11 mm long. Calyx stellate hairs very dense, white, 0.7–0.9 mm across, stalks 0–1.5 mm long, lateral rays 7–8; central ray 1–1.5 times as long as laterals, not gland tipped; simple hairs absent; Type 2 hairs absent. Corolla purple, 10–33 mm long, rotate, inner surface glabrous or rarely with a few stellate hairs at tip of lobes. Anthers 5.8–8 mm long, dorsifixed towards base. Filaments (1.6–) 2–3.3 mm long. Ovary glabrous. Functional style glabrous, 10–12.5 mm long, erect near base, then bent, displacing one anther. Fruiting calyx lobes less than or more than half length of mature fruit, lobes not recurved or strongly recurved; prickles 2–6 mm long. Fruits 1 per inflorescence, broadly ellipsoidal or less commonly globular, 21–30 mm diameter at maturity, yellow or yellowish-green, eventually turning very dark brown and prune-like, 2-locular, placenta stalked, anvil-shaped, extending the length of fruit; pericarp initially 1.5–4 mm thick, the innermost surface gelatinous and gradually deliquescing, finally 1–1.5 mm thick; internal cavity of fruit fluid-filled when fruits green or yellow. Pedicels at fruiting stage 20–55 mm long, 1.3–2.5 mm thick at midpoint. Seeds black, flattened, 3–4 mm long, 2.7–3.2 mm wide. **Fig. 1.**

Additional selected specimens examined: Queensland. GREGORY NORTH DISTRICT: 47.8 km from Dajarra, towards Mt Isa, May 2005, *Bean 23697* (BRI, UT); Trough Tank, Placer Pacific Osborne exploration lease, 31 km N of Pathungra, May 1993, *Gunness AG2187* (BRI); 70 miles [113 km] W of Winton on Boulia road, May 1966, *Pedley 2000* (BRI); 15 km NE of 'Burnham', Jun 1979, *Purdie 1551* (BRI). BURKE DISTRICT: Mt Isa, Nov 1930, *MacCallum s.n.* (BRI); 3.9 km by road along Gunpowder road from junction with highway, Jun 2004, *McDonald KRM2861* (BRI); Camooweal Caves N.P., Apr 2001, *McDonald KRM849* (BRI); Corella River, 88 km W of Cloncurry on road to Mt Isa, Jul 2003, *McKenzie RAM03/77* (BRI). **Northern Territory.** BURT PLAIN: 15 miles [24 km] N of Alice Springs, May 1968, *Nelson 1698* (MEL, NT). DARWIN COASTAL: 2 miles [3 km] E Howard Creek on Koolpinya road, Jan 1964, *Robinson 236* (DNA). DAVENPORT MURCHISON RANGE: 3.5 km N of Whistleduck Creek camping area, Davenport Range N.P., May 2005, *Bean 23802* (BRI, UT); near Dixon Creek, N of Devils Marbles, May 2005, *Bean 23832* (BRI, UT); 13.2 km S of Renner Springs, Jun 2005, *Bean 24167* (BRI, NY, UT). MITCHELL GRASS DOWNS: 18 miles [29 km] S of Elliot, Feb 1969, *Latz 426* (NT). ORD–VICTORIA PLAINS: Mt Sanford, Aug 2000, *Brock 124* (B, NT); Humbert River Station, Jun 1974, *Latz 5324* (AD, MO, NT). STURT PLATEAU: 3.5

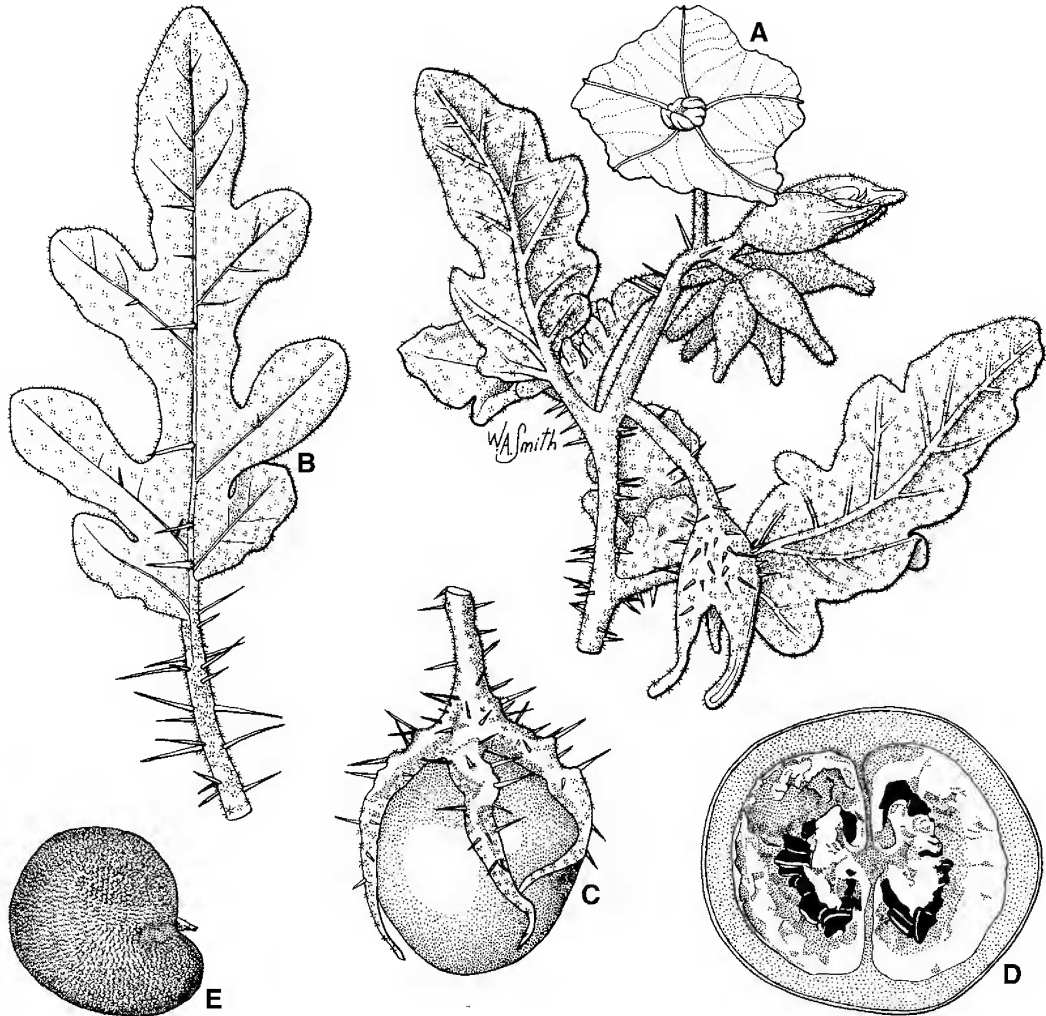


Fig. 1. *Solanum succosum*. A. flowering branchlet $\times 1$. B. adult leaf $\times 1$. C. calyx and fruit, close to maturity $\times 1$. D. transverse section of fruit $\times 1.5$. E. seed $\times 8$. A from McDonald KRM862 (BRI); B from Bean 23802 (BRI); C–E from McDonald KRM856 (BRI). Del. W. Smith.

km S of Three Ways, towards Tennant Creek, Apr 2001, McDonald KRM856 (BRI); N of Renner Springs, Apr 2001, McDonald KRM862 (BRI); 16 km S of Larrimah, Jun 1972, Symon 7639 (AD, B, NSW, NT); 1 km N of Larrimah, Jun 1975, Symon 10353 (AD, CANB, MO, NT). TANAMI: 7 miles S of Tennant Creek town, Mar 1955, Chippendale 956 (CANB, DNA, MEL, NT, S); 27 km S of Tennant Creek, July 1977, Latz 7419 (AD, NT); Newcastle Waters, 1887, Giles s.n. (MEL).

Distribution and habitat: *Solanum succosum* is found in summer rainfall dominated semi-arid and monsoonal parts of northwest Qld (from Lawn Hill National Park to Winton) and north central to northwest NT (from about

Humbert River Station in the northwest to as far south as about Wauchope). Two specimens (just north of Alice Springs on the verge of the Stuart Highway, and east of Howard Creek in the Darwin Coast bioregion) are distant from the main range of the species (Map 2). The former occurrence is undoubtedly due to human influence but the status of the latter is equivocal. Most records of the species are from *Triodia* dominated habitats on gravelly hillslopes, and gravelly or sandy plains and creeklines. A few records have been made from along tracks through Mitchell grass

country on clay plains. Germination of seeds and clonal regrowth are both evident after fire.

Phenology: This species may flower and fruit at any time of year, generally in response to a fire or rainfall event.

Notes: *Solanum succosum* is closely allied to *S. chippendalei* but differs in a number of respects. In *S. succosum*, the lower leaves (and often all leaves) are deeply lobed (not entire or shallowly lobed), the anthers are dorsifixed (not basifixed), the filaments are (1.6–) 2.0–3.3 mm long (compared to 5–7 mm long). The mature fruits are mostly longer than broad (although sometimes globular), have liquid-filled internal cavity, the pericarp is initially 1.5–3 mm thick, becoming thinner with age, and the placenta is longitudinally continuous. The fruits are very firmly attached to the calyx, and detached only with difficulty, then leaving a conical plug on the calyx. Fruits detached in this manner invariably exhibit two pores near the end of the fruit through which juice and seeds may be squirted. The seeds are 3–4 mm long and 2.7–3.2 mm wide, the lower leaf surface has stellate hairs 0.7–1.6 mm diameter, and stellate hairs on branchlets are 0.8–1.3 mm diameter.

By contrast, in *Solanum chippendalei* the leaves have shallow lobes throughout, or are (frequently) entire. The filaments are 0.5–1.5 mm long and basally attached; the mature fruits are globular, lack liquid in the internal cavity, the pericarp is 4–7.5 mm thick, not becoming thinner with age, and the placenta does not extend to the distal end of the fruit. The fruits are not firmly attached to the calyx, and mature fruits may often be seen lying on the ground after falling from the plant. The scar on the fruiting calyx is flat and circular. Detached fruits never exhibit pores. Seeds are (3.2–) 3.7–5 (–5.3) mm long and (2.5–) 2.8–4 (–4.6) mm wide, the lower leaf surface has stellate hairs 0.5–1 mm diameter, and stellate hairs on branchlets are 0.4–1 mm diameter.

Ethnobotany: Kaytetye and Anmatyerr peoples recognise *Solanum succosum* as distinct from *S. chippendalei*. Both language groups use the name *tyatyarkwerre* for *S. succosum* and regard the fruit as inedible,

one woman saying they are poisonous (Myf Turpin, pers. comm. 2007). Anmatyerr people use the names *anakety* or *antyewal* for *S. chippendalei* and regard the fruit highly (Latz 1995).

Etymology: From the Latin *succosus* meaning ‘juicy’. This refers to the liquid-filled internal cavity of mature fruits of this species, which contrasts strongly with the dry internal cavity of the related *Solanum chippendalei*.

Solanum chippendalei Symon, *J. Adelaide Bot. Gard.* 4: 272 (1981). **Type:** Western Australia, base of the Sir Frederick Range, 1 August 1962, *D.E. Symon 2272* (holo: AD; iso: AD, CANB, PERTH).

Illustrations: Symon (1981: 267, fig. 119); Latz (1995: 271–272).

Erect, rhizomatous perennial shrub, 0.25–1.5 m high. Adult branchlets white, grey, yellow, rusty or brown; prickles 4–26 per cm, straight, acicular, 2.5–8 mm long, 8–17 times longer than wide, with scattered stellate hairs on lower part. Adult branchlets with stellate hairs very dense, 0.4–1 mm diameter, stalks up to 0.8 mm long, lateral rays 7–9, porrect or ascending; central ray 0.7–1.6 times as long as laterals, not gland tipped. Adult leaves lanceolate, elliptical or ovate, entire or shallowly lobed throughout, lobes when present 3–5 on each side, obtuse, lobing index 1–2; lamina 3–13.2 cm long, 1.6–5.1 cm wide, 1.5–3.3 times longer than broad; apex obtuse or acute; base cuneate or obtuse; oblique part 2–12 mm long, obliqueness index 2–11 percent; petioles 1.2–4.3 cm long, 16–38% length of lamina, prickles present. Upper leaf surface grey-green or grey, prickles 0–4, straight, acicular, 2–4 (–8) mm long; stellate hairs distributed throughout, stellate hairs dense to very dense, 0.05–0.25 (–0.3) mm apart, 0.5–0.9 (–1.2) mm across, stalks 0.1–0.5 (–0.7) mm long; lateral rays 7–8, porrect; central ray 0.8–1.5 times as long as laterals, not gland tipped; simple hairs absent; Type 2 hairs absent. Lower leaf surface white, to yellowish, prickles 0–5 (–10), straight, acicular; stellate hairs very dense, 0.05–0.2 (–0.25) mm apart, 0.5–1 mm diameter, stalks 0.1–0.7 (–1) mm long; lateral rays 7–8, porrect; central ray 0.7–1.5 times as long as laterals, not gland tipped;

simple hairs absent; Type 2 hairs absent. Inflorescence leaf-opposed or supra-axillary, cymose, common peduncle up to 33 mm long, rachis prickles absent or present, 8–30-flowered, with one bisexual flower, the rest male. Flowers 5-merous, markedly dimorphic, with a larger pricklier basal flower. Pedicels at anthesis 5–27 mm long, prickles absent or present. Calyx prickles on basal bisexual flower 70–130, each 2–9 mm long; calyx prickles on distal male flowers 0–12, each 2–4.5 mm long; calyx tube at anthesis 2–6 mm long, lobes deltate to attenuate, 8–21 mm long. Calyx stellae very dense, white, 0.5–0.8 mm across, stalks 0–0.8 mm long, lateral rays 7–9; central ray 1–1.5 times as long as laterals, not gland tipped; simple hairs absent; Type 2 hairs absent. Corolla purple, 7–28 mm long, rotate or shallowly lobed, inner surface glabrous or sparsely stellate-hairy. Anthers 5–7 mm long, basifixed. Filaments 0.5–1.5 mm long. Ovary glabrous or with stellate hairs. Functional style glabrous, 12–13 mm long, erect near base, then bent, displacing one anther. Fruiting calyx lobes more than half length of mature fruit, lobes not recurved or rarely strongly recurved; prickles 1–7 mm long. Fruits 1 per inflorescence, globular to obovoid, 23–40 mm diameter at maturity, yellow or yellowish-green, 2-locular, placenta not apparent at distal end, pericarp 4–7.5 mm thick, not deliquescing; internal cavity of fruit not fluid-filled. Pedicels at fruiting stage 15–50 mm long, 1.5–2.7 mm thick at midpoint. Seeds black, flattened, (3.2–) 3.7–5 (–5.3) mm long, (2.5–) 2.8–4 (–4.6) mm wide.

Additional selected specimens examined: **Western Australia.** along No. 1 Rabbit Proof fence, 7 miles [11 km] N of Sandy Creek, May 1947, *Royce 1638* (PERTH); Dovers Hills, northern Gibson Desert, Jul 1967, *George 8977* (PERTH); 50 miles [80 km] W of Giles, Jun 1968, *Howard s.n.* (PERTH); Canning Stock Route, Jul 1976, *Palmer 27* (PERTH); Bloodwood Bore, Balweena Reserve, Aug 1969, *Nelson 1925* (PERTH); S side of Petermann Ranges, W of N.T. – W.A. border, Sep 1978, *Beaglehole 60602 & Errey* (PERTH); 14 km S of Kumarina, N of Meekeatharra, May 1975, *Symon 10000* (PERTH); 18 km S of Two Sisters, c. 160 km SE of Shay Gap, Jul 1984, *Newbey 10403* (PERTH); Balgo Hills, via Derby, 15 June 1967, *McNamara 1c* (PERTH). **Northern Territory.** BURT PLAIN: 21 miles [34 km] SW of Napperby Station, Sep 1956, *Lazarides 6001* (CANB, NT, PERTH); Stirling Bore, 5 miles [8 km] S of Barrow Creek township, Sep 1955, *Perry 5349* (K, L, MEL, NSW, NT, US). DAVENPORT MURCHISON RANGE: Elkedra Station,

May 1977, *Latz 6962* (ADW, BRI, NSW, NT); 98 km E of Three Ways on Barkly Highway, Jun 2004, *McKenzie RAM04/63* (BRI). GREAT SANDY DESERT: Wartupunya Rockhole, Jan 1972, *Latz 2137* (ADW, NT); Pulca Currinya, Mt Wedge Station, Sep 1976, *Latz 6601* (ADW, CANB, NT). MACDONNELL RANGES: Mt Liebig area, Apr 1972, *Latz 2272* (ADW, NT); Haasts Bluff airstrip, Nov 1976, *Latz 6667* (ADW, CANB, NT). ORD VICTORIA PLAIN: road to Lajamanu from Buntine Highway, May 2004, *Brennan 6299* (AD, DNA, NT, PERTH). TANAMI: Stuart Highway near Ali Curung turnoff, Jun 2006, *Albrecht 12049* (BRI, NT); The Granites Tenements, Dec 1984, *Kalotas 1797* (ADW, NT, PERTH).

Distribution and habitat: *Solanum chippendalei* is found in arid and semi-arid parts of north central to southwest NT (from Wave Hill Station in the northwest to Georgina Downs in the northeast, and to Docker River in the far southwest), extending westward into WA as far west as the Pilbara (**Map 1**). A specimen from Alice Springs (*Latz 22296*) is certainly a recent introduction from seed discarded by aborigines. It occurs in *Triodia* dominated communities on sandy or gravelly plains and hillslopes. Germination and clonal regrowth is strongly encouraged by fire or soil disturbance and it is commonly found on roadsides.

Phenology: Flowers and fruits can be found at any time of the year depending on timing of rains and/or fire.

Notes: *Solanum chippendalei* is closely allied to *S. succosum* (see notes under that species). It is also very close to *S. phlomoides* A.Cunn. ex Benth. Both *S. chippendalei* and *S. phlomoides*, as currently understood, are quite variable, and distinguishing between them is difficult.

Ethnobotany: The fruit of *Solanum chippendalei* is an outstandingly important plant food for central Australian aborigines throughout its distribution range, and it has various language names. The seeds are removed and the thick pericarp eaten, which has a rather bland taste reminiscent of cantaloupe (rockmelon). Although relatively high in vitamin C, it has quite low protein and fat values (Latz 1995). The ripe fruit has excellent keeping qualities. Those not eaten fresh are sometimes threaded onto skewers or made into pasteballs, dried and stored for considerable periods. In recent times

Alywarr people (NT) have deliberately established colonies of *S. chippendalei* south of its natural range by scattering seeds near their camp sites (Latz 1995). This practice has also been reported by Walsh (in prep.) for the Martu people of the western Great Sandy Desert area in the vicinity of Rudall River and the central Canning Stock Route. Martu elders assert that they have always scattered the seeds of *S. chippendalei* and believe that it is their role to disperse productive plants (Walsh, in prep.).

Several language groups, e.g. Warlpiri, Pitjantjatjara, Martu and probably Pintubi recognise two forms of *Solanum chippendalei* (Latz 1995; Walsh, in prep.). The form found on hillsides is called *ngayaki* (Warlpiri), *pura* (Pitjantjatjara) and *piljiwin* (Mantu), and the sandplain form is called wanakiji (Warlpiri) and *pura* (Mantu) (Latz 1995; Walsh, in prep.). In our investigations we have not found any reliable morphological characters that differentiate the habitat forms recognised by some aboriginal groups.

Etymology: Named for George Chippendale (1921–extant), a botanist who worked for many years in the arid parts of Northern Territory, based at Alice Springs.

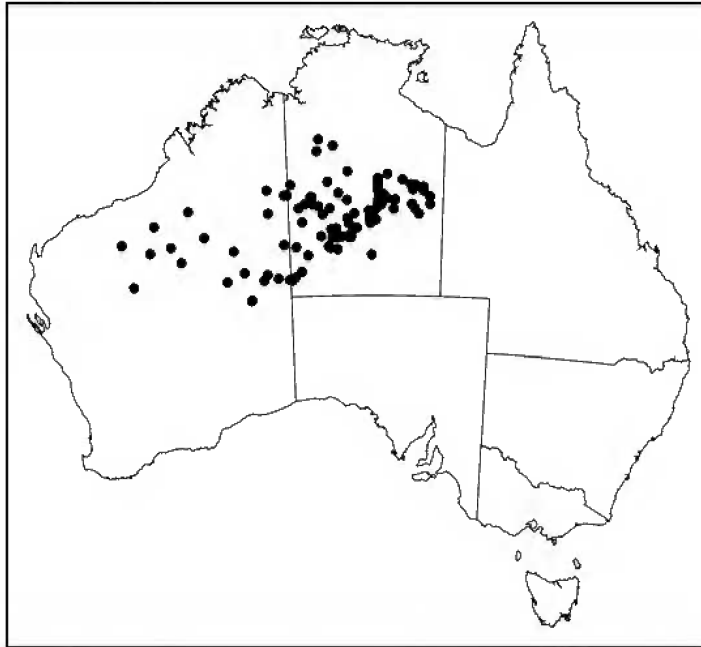
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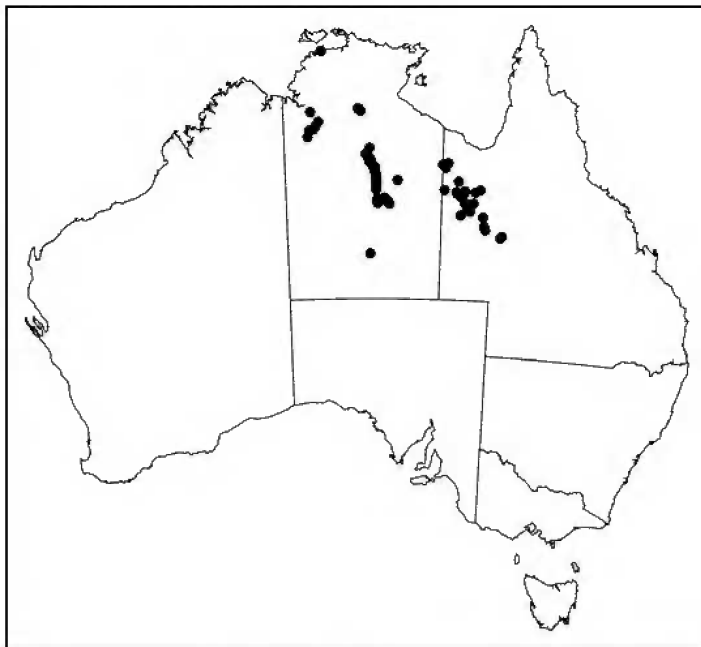
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Map 1. Distribution of *Solanum chippendalei*.



Map 2. Distribution of *Solanum succosum*.